

CLAIMS

1. In a method of mechanically mixing and dispersing a paste material and a low-pressure gas to produce an expandable material, followed by discharging and expanding the expandable material to produce a cured product, wherein the improvement comprises using as the paste material a one-pack type curing paste material having viscosity characteristics included in the zone defined by points A, B, C and D in the graph of Fig. 1 showing the relationship between shear rate and apparent viscosity, said points A and B being at 50-30000 poises of an apparent viscosity (measured by a Brookfield rotary viscometer using spindle No.7, at 2 rpm, at 20°C) in low shear rate region (0.43 sec^{-1}) and said points C and D being at 20-2000 poises of an apparent viscosity (measured by an apparent viscosity meter according to JIS K2220, at 20°C) in high shear rate region (783 sec^{-1}), and mechanically mixing and dispersing the one-pack type curing material and a low-pressure gas, followed by discharging and expanding the resulting expandable material to produce a cured product with dense uniform closed-cells.

2. The discharging and expanding method according to claim 1,

wherein the method of mechanically mixing and dispersing a one-pack type curing paste material and a low-pressure gas to produce an expandable material comprises

supplying the low-pressure gas into a cylinder during
5 and/or after a suction stroke of a piston pump which is reciprocated in the cylinder to carry out suction stroke and discharge stroke, then

supplying the one-pack type curing paste material into the cylinder by batch process,

10 carrying out the discharge stroke by using the piston pump after supplying the one-pack type curing paste material, and

discharging the low-pressure gas and the one-pack type curing paste material to a pipe in the discharge stroke.

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3. The discharging and expanding method according to claim 1 or 2, wherein the method of producing an expandable material and discharging and expanding the expandable material is carried out by using a mechanical foaming
20 apparatus comprising,

a piston pump including a piston and a cylinder, in which the piston is adapted to reciprocally move within the cylinder to effect suction stroke and discharge stroke;

a gas supplying device for supplying a low-pressure
25 gas into the cylinder under a predetermined pressure;

a paste material supplying device for supplying a one-pack type curing paste material into the cylinder under a predetermined pressure;

5 a control device for effecting control to supply the low-pressure gas into the cylinder during and/or after the suction stroke of the piston pump, supply the one-pack type curing paste material into the cylinder, effect the discharge stroke of the piston pump after the supplying stroke of the one-pack type curing paste material, and
10 discharge the low-pressure gas and the one-pack type curing paste material into a pipe; and

a discharge device for discharging and expanding the expandable material into the pipe by connecting the pipe of the expandable material obtained from the control device.

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4. The discharging and expanding method according to one of claims 1 to 3,
wherein the expandable material is adapted for a sealant, an adhesive, a coating material , a gasket, a packing, a
20 cushion, an insulator, and/or a foamed molded material.

5. A one-pack type curing paste material to be used in the discharging and expanding method according to one of claims 1 to 4, which have viscosity characteristics included in
25 the zone defined by points A, B, C and D in the graph of

Fig. 1 showing the relationship between shear rate and apparent viscosity, said points A and B being at 50-30000 poises of an apparent viscosity (measured by a Brookfield rotary viscometer using spindle No.7, at 2 rpm, at 20°C) in low shear rate region (0.43 sec^{-1}) and said points C and D being at 20-2000 poises of an apparent viscosity (measured by an apparent viscosity meter according to JIS K2220, at 20°C) in high shear rate region (783 sec^{-1}).

6. The one-pack type curing paste material according to claim 5, wherein the material is a moisture-curable type, a thermosetting type, a hotmelt type, a sol-gel type, a vulcanization-crosslinking type, and/or a photo/radiation-curable type, comprising silicones, polyurethanes, epoxies, synthetic rubbers, polyolefins, polyesters, acrylic resins, poly(vinyl chlorides), thermoplastics, thermoplastic elastomes.